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Question Paper Code : X20852

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Seventh/Eighth Semester

Mechanical Engineering

ME 6703 – COMPUTER INTEGRATED MANUFACTURING SYSTEMS

(Common to Mechanical and Automation Engineering/Robotics and
Automation Engineering)

(Regulations 2013)

(Also Common to PTME 6703 : Computer Integrated Manufacturing Systems for
B.E. (Part – Time) – Seventh Semester – Mechanical Engineering
– Regulations 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. State any four benefits of computers in design.
2. Differentiate between push and pull type production system.
3. State the four activities within the scope of production planning.
4. What is Enterprise Resource Planning (ERP) ?
5. What are the limitations of production flow analysis ?
6. State three categories of parts classification and coding system.
7. What are the benefits of FMS ?
8. Name three categories of automated guided vehicle.
9. What is meant by pitch, yaw and roll ?
10. List any four motion commands in VAL language.

PART – B

(5×13=65 Marks)

11. a) i) Explain with neat block diagram six phases of design process using computer aided design (CAD). **(6)**
ii) Enumerate various computerized elements of a CIM system. **(7)**

(OR)



- b) i) Compare traditional product development cycle and product development using concurrent engineering. (9)
- ii) A production machine operates 80 hr/week (2 shifts, 5 days) at full capacity. Its production rate is 20 unit/hr. During a certain week, the machine produced 1000 parts and was idle the remaining time. (4)
- Determine the production capacity of the machine. What was the utilization of the machine during the week under consideration ?
12. a) Compare retrieval and generative computer aided process planning systems. (13)
- (OR)
- b) i) Describe with neat block diagram structure of a Material Requirement Planning (MRP). (6)
- ii) Explain with neat block diagram three phases of shop floor control system. (7)
13. a) i) Compare process type plant layout and group technology layout. (9)
- ii) Describe various steps in quantitative analysis of cellular manufacturing. (4)
- (OR)
- b) Enumerate Optiz parts classification and coding system. (13)
14. a) i) Discuss FMS workstations. (6)
- ii) Describe functions of material handling and storage system in FMS. (7)
- (OR)
- b) i) Describe the vehicle guidance technology in an automated guided vehicle system. (7)
- ii) Discuss vehicle management and safety in AGVs. (6)
15. a) i) Discuss any two robot configurations using neat sketches. (7)
- ii) Describe with neat sketch the principle of vacuum gripper. (6)
- (OR)
- b) i) Enumerate with neat sketches the working principle of slip sensors and proximity sensor. (7)
- ii) Describe any three applications robotics in manufacturing. (6)



PART – C

(1×15=15 Marks)

16. a) i) Make a comparison of mass production and lean production. (5)
- ii) Four drill holes are to be made on a circular workpiece of diameter 100 mm as shown in Figure Q. 16 a ii) Four holes are located in a circle of radius 25 mm. Write a program to bring the end-effector holding a drill of 6 mm diameter to each location of the hole in sequential order of 1, 2, 3, 4. (10)

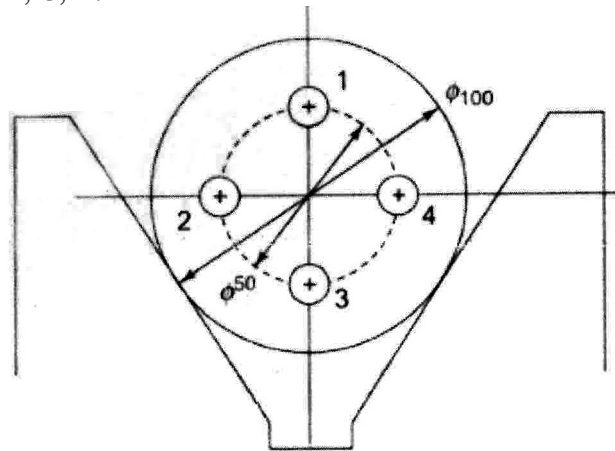


Figure 16 a ii)

(OR)

- b) i) Suppose a company has designed a new product line and is planning to build a new plant to manufacture this product line. The new line consists of 100 different product types and for each product type the company wants to produce 10,000 units annually. The products average 1000 components each, and the average number of processing steps required for each component is 10. All parts will be made in the factory. Each processing step takes an average of 1 min. Determine :
How many products, how many parts, How many production operations will be required each year, and how many workers will be needed for the plant, if it operates one shift for 250 day/yr ? (10)
- ii) The following data are given for a work center consisting of one worker and one machine, direct labour rate = Rs. 20/hr, applicable factory overhead rate on labour = 60%, capital investment in machine = Rs. 10,00,000, service life of the machine = 8 years, rate of return = 20%, salvage value in 8 yr = 0, and applicable factory overhead rate on machine = 50 %. The work centre will be operated one 8-hr shift, 250 days/year. Determine the hourly rate for the work centre. (5)